REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Objection to Claims 4 and 5

This objection has been addressed by substituting "means for. . ." for "adapted to" in claims 4 and 5.

2. Rejection of Claim 1 Under 35 USC §103(a) in view of U.S. Patent Nos. 5,223,705 (Aspell); 6,040,933 (Khaleghi); and 5,917,649 (Mori)

This rejection has been rendered moot by the addition, to claim 1, of several of the limitations of claim 3.

2. Rejections of Claims 2-5 Under 35 USC §103(a) in view of U.S. Patent Nos. 5,223,705 (Aspell); 6,040,933 (Khaleghi); and 5,917,649 (Mori); and 6,384,956 (Shieh)

These rejections are respectfully traversed on the grounds that the Aspell, Khaleghi, Mori, and Shieh patents, whether considered individually or in any reasonable combination, fail to disclose or suggest a method for monitoring an optical amplifier in which the state of polarization of an optical input signal is forced to be **continuously changed** by, for example, rotating quarter wave plates (and separating the noise and signal are separated by rotating polarizers), and the OSNR is calculated based on minimum and maximum polarization values, so that the calculation of the OSNR is not dependent on the actual state of polarization.

The present invention solves a problem with the type of optical amplifier monitoring disclosed by Aspell. The problem is that the decline in capability of a WDM network does not primarily result from the noise produced by an optical amplifier, but rather results from deterioration of optical lines, which causes a change in OSNR due to the change in optical output. Adjustments in the amplification of the signal can compensate for the increased losses in the optical lines, but not for the increased OSNR. As a signal travels through the optical network, the losses and state of polarization of the optical signals changes continuously. The

Aspell method, which accurately measures the degree of saturation of the optical amplifier, cannot account for system losses or polarization changes in the input signal. Instead, Aspell is concerned solely with optical amplifier performance and does not suggest any modifications that would enable system losses and polarization changes to be taken into account.

In contrast to the system disclosed by Aspell, the claimed invention takes into account all polarization states, by forcing the optical input signals through a rotating quarter-wave plate and linear polarizer, the rotation of the plate having the effect of continuously changing the polarization of the input signals, and the rotation of the polarizer permitting separation and measurement of the respective noise and signal components of the input signals, and basing the calculation on measured minimum and maximum values. The resulting calculations are simple enough to be performed in real time, and are yet not affected by the actual polarization of the input signal.

According to the Examiner, Aspell's failure to teach changing polarizations in the manner claimed, and/or the claimed rotating quarter-wave plate and polarizer, is made up for by the Shieh patent's teaching of a polarization controller comprising several quarter-wave plates used to maintain the output state of the polarization. This combination is improper for two reasons:

a. unlike the polarization controller of Shieh, the quarter-wave plates of the invention do not maintain the output state of the polarization, but to the contrary change the polarization to get all values of the "Poincare sphere"; and

b. the method of Aspell does not require maintaining the output state of the polarization, and the Shieh patent, which has nothing to do with measurement of noise in an optical amplifier, does not provide a reason to do so.

In effect, the Shieh patent teaches the opposite of the claimed invention, namely a system for maintaining a constant polarization, and/or controlling polarization to get an arbitrary value, rather than one that continuously changes the polarization in order to cancel out polarization effects of optical lines when measuring OSNR.

Aspell's failure to teach the claimed continuously changing polarization is not made up for by the Khaleghi patent, which is directed to channel equalization in a WDM system and does not involve rotating quarter wave plates or polarizers of any type. Instead, the method disclosed in the Khaleghi patent involves measuring optical signal outputs of multiple channels and adjusting optical power inputs to equalize SNR's between channels. This has nothing to do with the claimed SNR measurement involving rotating quarter wave plates and linear polarizers..

Finally, the Mori patent does not make up for the deficiencies of the Aspell, Shieh, and Khaleghi patents since the Mori patent concerns a system in which the SNR of an optical amplifier is measured based the power of *electrical* rather than *optical* signals. Like the Khaleghi patent, the Mori patent does not even remotely suggest use of rotating quarter wave and linear polarizer plates to account for optical-line induced polarization changes in the system of Aspell.

Because the Aspell, Khaleghi, Mori, and Shieh patents, whether considered individually or in any reasonable combination, fail to disclose or suggest all elements recited in claim 1, and in particular the rotating quarter wave plate and linear polarizer means, withdrawal of the rejection under 35 USC §103(a) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,

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